LOCKOUT/TAGOUT
AND ENERGIZING PROCEDURE
FOR ATR X ARC AND Y ARC POWER SUPPLIES

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1. Purpose and Scope

1.1 The purpose of this procedure is to provide instructions in how to perform the lock out and tag out or energizing of the ATR X Arc and Y Arc power supplies (XYPS).

1.2 There are two Arc Power Supplies: one for the X Arc and one for the Y Arc. The maximum output is 350 VDC at 3200 ADC. Both are located in building 1000P.

1.3 This procedure is only to be performed by the persons qualified, as described in paragraph 2.

2. Responsibilities

2.1 ONLY persons with current training in BOTH *general* LOTO procedures, and LOTO procedures *specific* to the XYPS will be authorized to perform the steps in this procedure. A member of the linecrew will be required for locking out or energizing XYPS.

3. Prerequisites

3.1 Personnel performing this procedure shall be authorized by the ATR power supply engineer.

3.2 The authorization shall be renewed yearly.

3.3 Authorized persons will be trained with:

3.3.1 A discussion on electrical safety.

3.3.2 A demonstration on the proper procedure for LOTO of the substation contactors, with "hands-on" training.

4. Precautions

WARNING: ***FAILURE TO IMPLEMENT THIS PROCEDURE AND SEAPPM 1.5.1 COULD CAUSE FATAL OR SERIOUS INJURIES TO PERSONNEL.***

4.1 Notification

Notify personnel in the area of the action to be taken, in accordance with BNL LOTO policy.

5. Procedure

5.1 Companion Documents

5.1.1 These procedures are ONLY to be performed by authorized personnel as defined in section 2.2, and only with the XYPS in a state where LOTO can be safely performed, as indicated by the current operational procedure for the ATR X Arc and Y Arc Power Supplies.

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5.1.2 The requirements of SEAPPM 1.5.1 Logout/Tagout Requirements, shall be followed.

5.2 Y-ARC or X-ARC P.S. ENERGIZING PROCEDURE

5.2.1 Follow figures 1 - 6 for this procedure. Figure 2 is a drawing of the contactor control panel seen in figure 6.

5.2.2 To energize the power supplies the first step is to turn on the UPS control power for the power supply and then for the contactor. For the X ARC p.s. control power turn on breaker #11 in the UPS panel labeled 1000P-PP1. For the Y-ARC p.s. control power turn on breaker #5 in the UPS panel labeled 1000P-PP1.

5.2.3 Next turn on the control power for the contactors. For the X-ARC Contactor turn on breaker #9 in the UPS panel labeled 1000P-PP1. For the Y-ARC Contactor turn on breaker #3 in the UPS panel labeled 1000P-PP1. There is a white light on the p.s. labeled “Contactor Control Power”. This light will light when the contactor control power circuit breaker in panel 1000P-PP1 is energized and the p.s. is in Standby. Put the p.s. in LOCAL.

5.2.4 To unlock the p.s. 15KV contactor start at the back door of the power supply (see figure 1). Lock the kirklock on the back door of the power supply so key #1 releases and take key#1 from the back door kirklock to the kirklock on the front door.

5.2.5 Lock the kirklock on the front door by turning keys #1 and #2. Key #2 will now release.

5.2.6 Take key #2 out of the kirklock on the front door of the p.s. and bring it over to the 480volt disconnect located behind the Inverpower 15kw and 25kw p.s.'s.

5.2.7 Place key #2 in this 480v disconnect switch labeled "Y-Arc 480v disconnect" or "X-Arc 480v disconnect". Turn keys #2 and #3 in the 480v disconnect. Key #3 will now release. Take key #3 out of the 480v disconnect switch. Key #3 will be used to unlock the kirklock on the contactor in the substation.

5.2.8 Energize the 480v disconnect switch.

5.2.9 Energize the black breaker switch labeled "**480 breaker switch**" at the bottom right side of the 1MW power supply. This is the blower power for the power supply

5.2.10 **There must be a minimum of two authorized people entering the substation and one must be a member of the linecrew because he will close the fused disconnect that feeds the X and Y ARC p.s. contactors.** Go into the 1000P substation with key #3 and always take another authorized person in with you. Look for the contactor labeled "Y-ARC" or "X-ARC". See figures 3 and 4 for a view of the 1000P substation and the contactors.

WARNINGS
The only equipment that you should be going near, in the substation, is the contactor. Do not go near any other equipment in the substation.

Make sure the blades of the fused disconnect are open before unlocking the contactors.

5.2.11 Open the front door of the contactor (see figures 2, 5 and 6). When the door is opened you will see a kirklock in front of you next to the black control panel in the contactor. Unlock the kirklock with key#3.

5.2.12 Push in the triangular metal bracket and also pull out the right angle metal bracket underneath the triangular metal bracket. This is the mechanical lockout mechanism. It is now unlocked.

5.2.13 Push up on the toggle switch labeled "contactor control power" in figure 6. You will hear a loud winding noise. The spring will now be engaged.

5.2.14 Close the door to the contactor and leave the substation.

5.2.15 The linecrew can now close the fused disconnect

5.3 Y-ARC or X-ARC P.S. DEENERGIZING PROCEDURE

5.3.1 Follow figures 1 - 6 for this procedure. Figure 2 is a drawing of the contactor control panel seen in figure 6.

5.3.2 Make sure the p.s. is in the OFF state before locking it out. If the green OFF light is lit the p.s. is OFF. Look at the AC voltmeter. Check that all three line voltages read zero volts by moving the AC voltmeter selector switch. Put the p.s. in LOCAL.

5.3.3 Deenergize the black breaker switch labeled "**480 breaker switch**" at the bottom right side of the 1MW-2 power supply.

WARNING
The only equipment that you should be going near, in the substation, is the contactor. Do not go near any other equipment in the substation.

5.3.4 **There must be a minimum of two authorized people entering the substation and one must be a member of the linecrew because he will open the fused disconnect that feeds the X and Y ARC p.s. contactors.**. Go into the 1000P substation to lock out the 15kv contactor (see figure 1). The linecrew member must open the fused disconnect now.

5.3.5 Once the linecrew member has locked out the fused disconnect that feeds the contactors the contactors can be locked out. See figures 3 and 4 for a view of the 1000P substation and the contactors. Open the front door (see figures 2, 5 and 6). Push down on the toggle switch labeled "contactor control power" to the OFF position.

5.3.6 Push up on the small hook shaped piece of metal labeled "spring discharge". You should hear a loud banging noise once. This is the spring discharging.

5.3.7 Push in on the small right angle bracket on the bottom of the flat black plate and pull out on the triangular shaped metal bracket sticking out of the middle of the flat black plate. Turn the key (#3) in the kirklock and remove it. The contactor is now locked out. Close the door and leave the substation. Re-enter building 1000P.

5.3.8 Take key #3 over to the 480 volt disconnect located behind the Inverpower 15kw and 25kw p.s.'s. This 480v disconnect switch is labeled "Y-Arc 480v disconnect" or "X-Arc 480v disconnect". Deenergize the 480v disconnect (see figure 1).

5.3.9 Put key #3 into the kirklock on the 480v disconnect and turn both keys #2 and #3 so that the kirklock is now locking out the 480v disconnect switch as in the diagram. Key #2 will now release from the kirklock. Hold onto this key.

5.3.10 Go to UPS circuit breaker panel 1000P-PP1 and deenergize the 120v circuit breaker #3 for the Y-Arc Contactor Control Power or #9 for the X-Arc Contactor Control Power. There is a white light on the p.s. labeled "Contactor Control Power". This light will go off when the contactor control power circuit breaker in panel 1000P-PP1 is de-energized and the p.s. is in Standby.

5.3.11 In the same UPS panel you can now turn off the control power to the X -ARC and Y-ARC power supplies. In panel 1000P-PP1 turn off breaker #11 for the X-ARC power supply control power. Turn off breaker #5 for the Y-ARC power supply control power. Once the UPS power has been de-energized the OFF light on the power supply will go Off.

5.3.12 Take key #2 over to the front door of the Y-Arc p.s. or X-Arc p.s. and insert it into the #2 slot. Turn both keys #1 and #2 so that the front door kirklock unlocks the front door. Key #1 will now release.

5.3.13 Now that the front door is unlocked check that all three line voltages read zero volts. Measure across TB2-5 to TB2-6 with a Wiggins. This is the line voltage a to b (Vab). Measure across TB2-6 to TB2-7 with a Wiggins. This is the line voltage b to c (Vbc). Measure across TB2-5 to TB2-7 with a Wiggins. This is the line voltage a to c (Vac). Also measure from TB2-5 to ground, then TB2-6 to ground and then TB2-7 to ground. If all of these measurements read zero volts then the contactor is open.

5.3.14 Take key #1 out of the front door kirklock. The front door can now be opened to service the power supply.

5.3.15 Key #1 can be used to open the back door or can be taken somewhere else and locked up so that the power supply cannot be energized.

6. Documentation

6.1 LOTO Logbook.

7. References

7.1 SEAPPM 1.5.1 Logout/Tagout Requirements.

8. Attachments

1. Figure 1
2. Figure 2
3. Figure 3
4. Figure 4
5. Figure 5
6. Figure 6

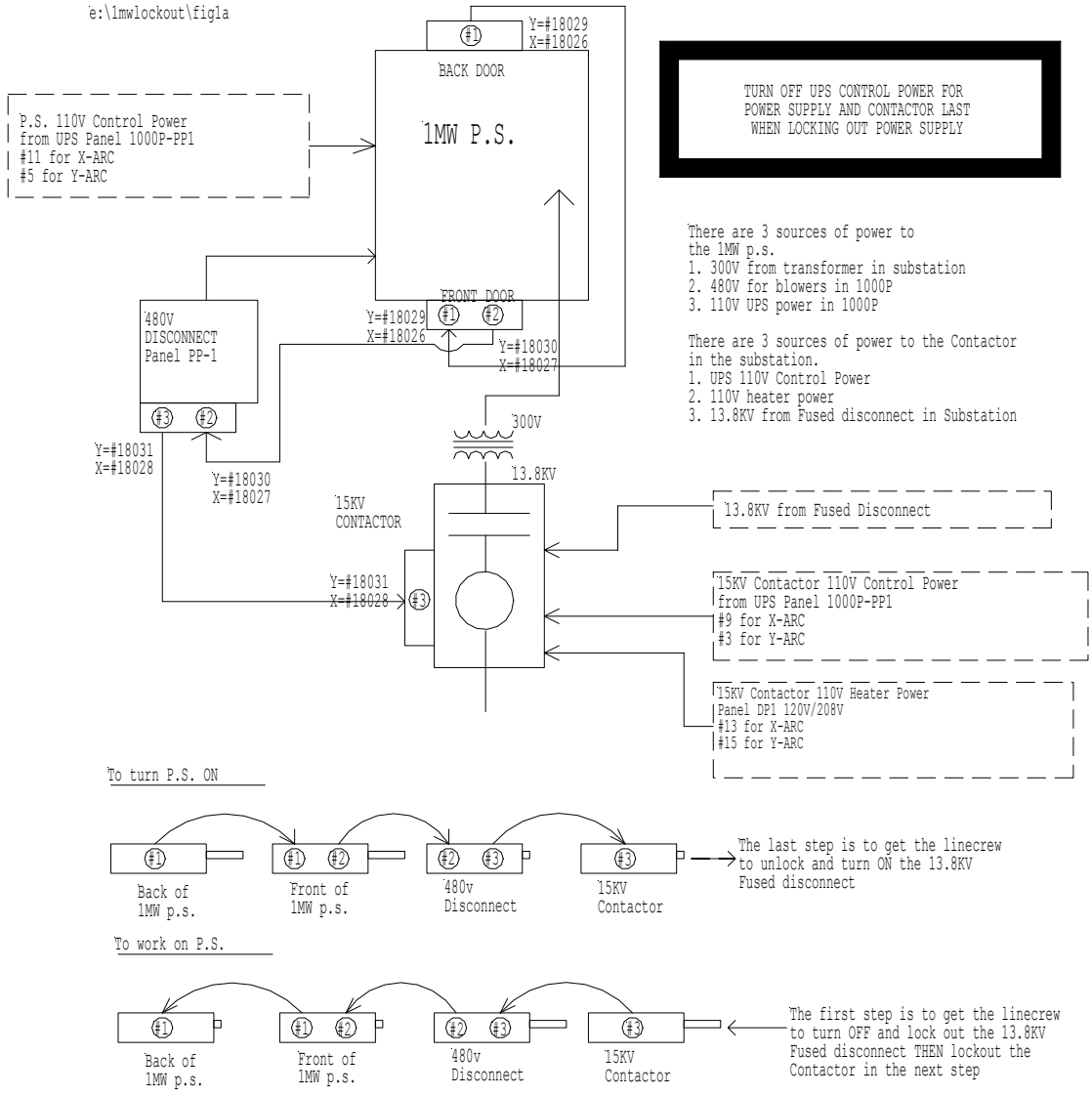
e:\1mwlockout\fig1a
Y=#18029
X=#18026
#1
BACK DOOR
1MW P.S.
P.S. 110V Control Power
from UPS Panel 1000P-PP1
#11 for X-ARC
#5 for Y-ARC
TURN OFF UPS CONTROL POWER FOR
POWER SUPPLY AND CONTACTOR LAST
WHEN LOCKING OUT POWER SUPPLY
There are 3 sources of power to
the 1MW p.s.
1. 300V from transformer in substation
2. 480V for blowers in 1000P
3. 110V UPS power in 1000P
There are 3 sources of power to the Contactor
in the substation.
1. UPS 110V Control Power
2. 110V heater power
3. 13.8KV from Fused disconnect in Substation
480V
DISCONNECT
Panel PP-1
#3
#2
FRONT DOOR
#1
#2
Y=#18029
X=#18026
Y=#18030
X=#18027
300V
13.8KV
Y=#18031
X=#18028
Y=#18030
X=#18027
15KV
CONTACTOR
13.8KV from Fused Disconnect
Y=#18031
X=#18028
#3
15KV Contactor 110V Control Power
from UPS Panel 1000P-PP1
#9 for X-ARC
#3 for Y-ARC
15KV Contactor 110V Heater Power
Panel DP1 120V/208V
#13 for X-ARC
#15 for Y-ARC
To turn P.S. ON
#1
#1
#2
#2
#3
#3
Back of
1MW p.s.
Front of
1MW p.s.
480v
Disconnect
15KV
Contactor
The last step is to get the linecrew
to unlock and turn ON the 13.8KV
Fused disconnect
To work on P.S.
#1
#1
#2
#2
#3
#3
Back of
1MW p.s.
Front of
1MW p.s.
480v
Disconnect
15KV
Contactor
The first step is to get the linecrew
to turn OFF and lock out the 13.8KV
Fused disconnect THEN lockout the
Contactor in the next step

Figure 1

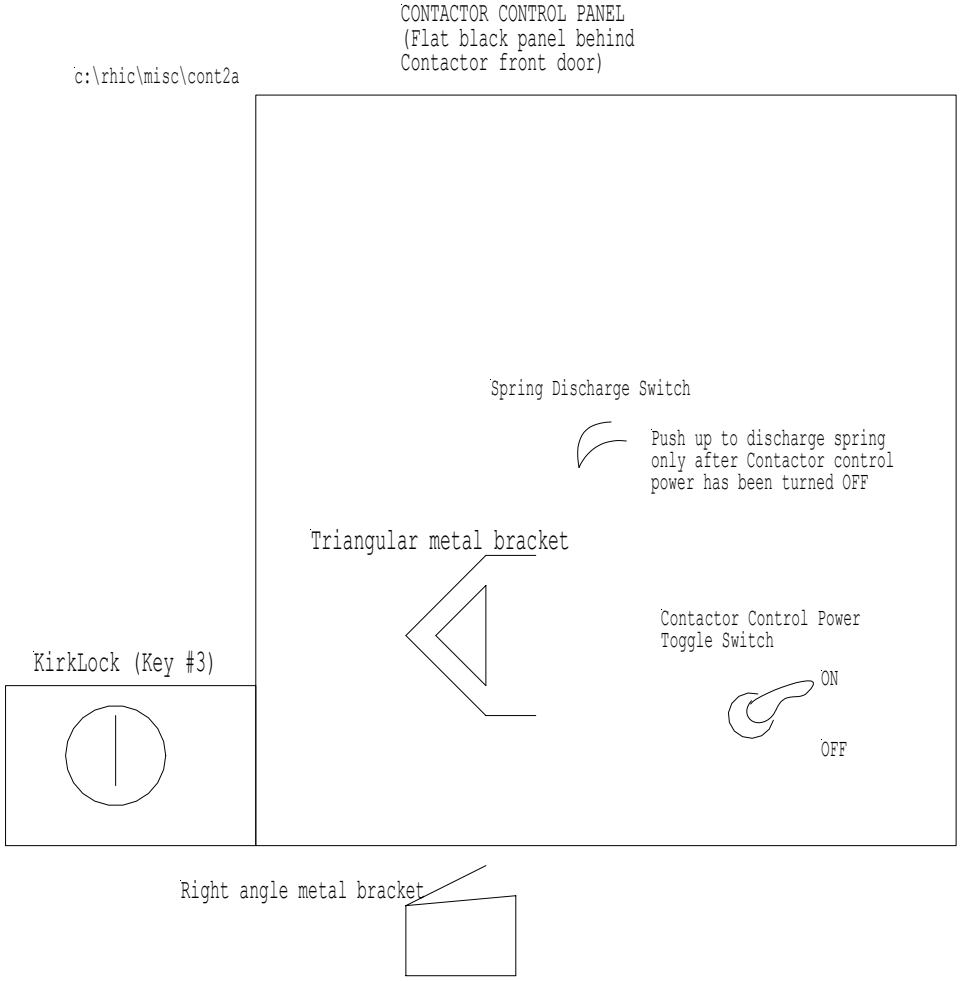
CONTACTOR CONTROL PANEL
(Flat black panel behind
Contactor front door)
c:\rhic\misc\cont2a
Spring Discharge Switch
Push up to discharge spring
only after Contactor control
power has been turned OFF
Triangular metal bracket
Contactor Control Power
Toggle Switch
ON
OFF
KirkLock (Key #3)
Right angle metal bracket

FIGURE 2

FIGURE 3 (1000P SUBSTATION)

X-ARC
CONTACTOR

Y-ARC
CONTACTOR

FIGURE 4 (1MW CONTACTORS)

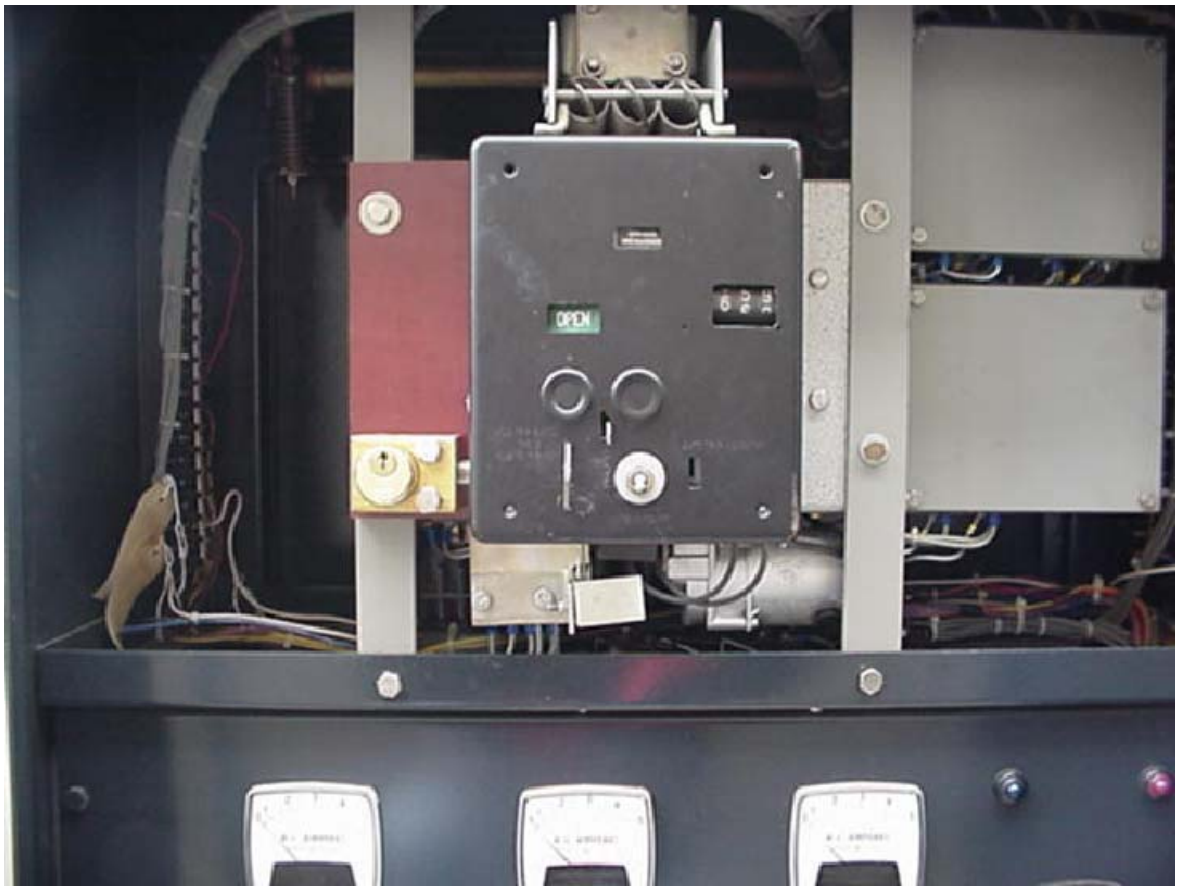

FIGURE 5

(FRONT DOOR OF CONTACTOR
OPEN)

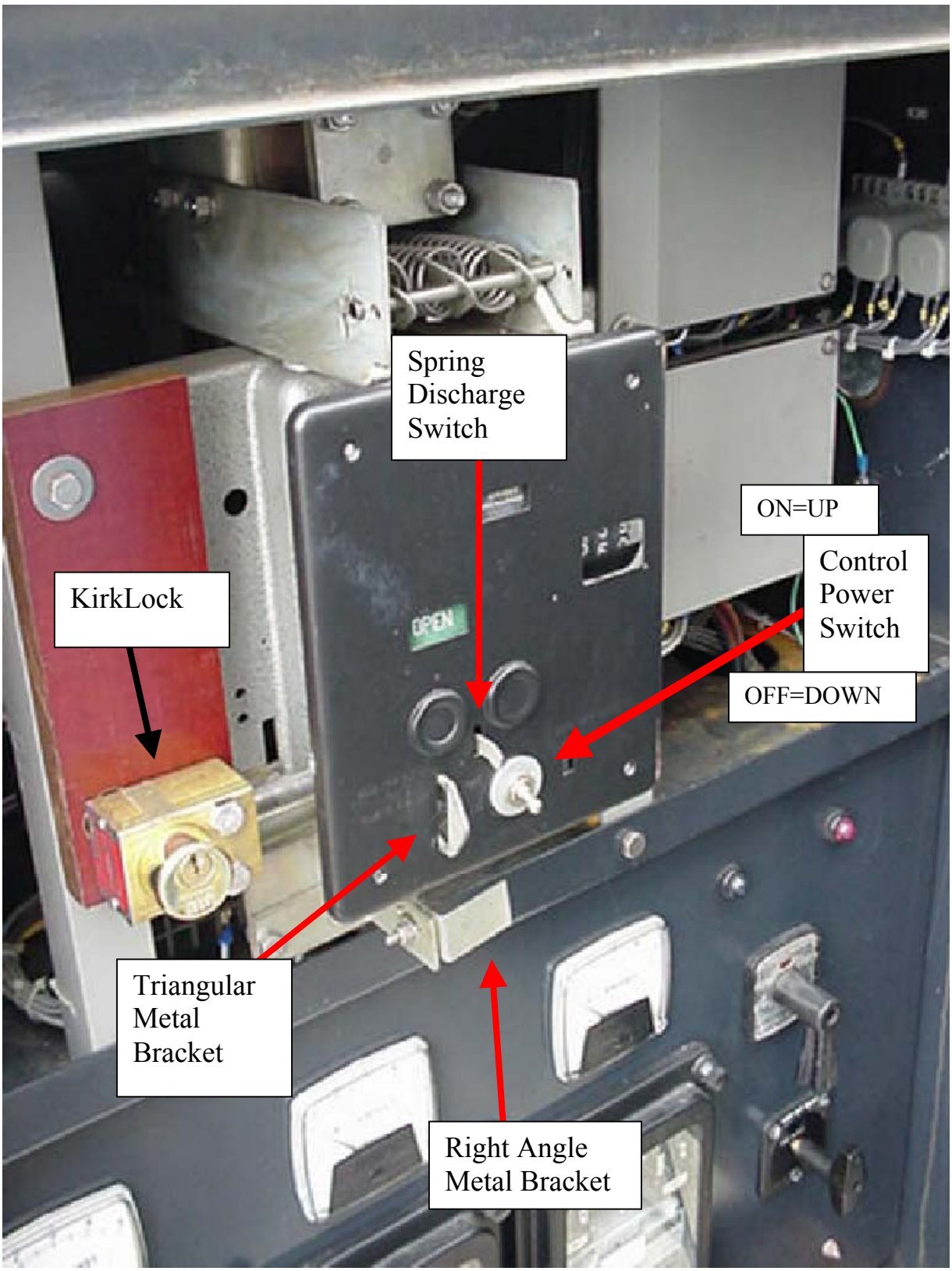
Spring
Discharge
Switch
ON=UP
Control
Power
Switch
KirkLock
OFF=DOWN
Triangular
Metal
Bracket
Right Angle
Metal Bracket

FIGURE 6